



USDA Update: The SBIR Program and the USDA/REE Strategic Energy Plan

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OVERVIEW

- **USDA SBIR Program**
- **USDA/REE Energy Strategic Plan**
- **Closing Remarks**

Features of USDA SBIR Program

Phase I Grants = 8 Months/\$80,000

Phase II Grants = 2 Years/\$350,000
(\$400,000 in 2010?)

University participation is encouraged

Commercialization Assistance Program in
Phase I and Phase II

12 Topic Areas

- Forests & Related Resources
- Plant Production & Protection, Biology
- Plant Production & Protection, Engineering
- Animal Production and Protection
- Soil & Water Resources
- Food Science & Nutrition
- Rural & Community Development
- Aquaculture
- Biofuels and Biobased Products
- Marketing & Trade
- Animal Manure Management
- Small & Mid-Size Farms



USDA/REE Energy Science Strategic Plan for Research, Education, and Extension

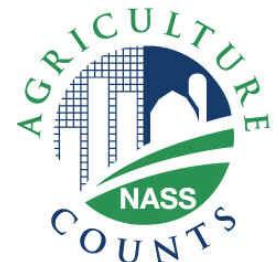
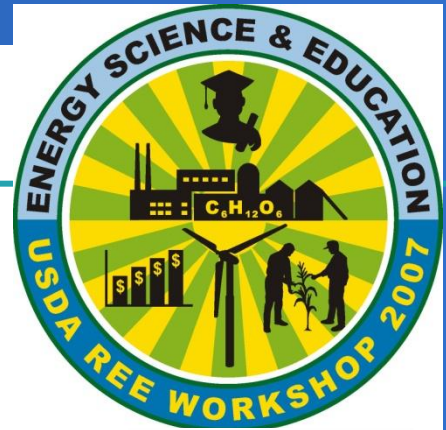
USDA Energy Research, Education, and Extension –The Beginning

- Establish the USDA as a **world leader** for its **agricultural research, education and outreach** contributions to achieving a desirable level of energy independence for this nation
- Develop comprehensive, integrated intramural and extramural **research and education** programs that effectively explore the role of agriculture as both a user and producer of energy.
- **Coordinate and collaborate** energy research and education activities related to agriculture (including forestry) with other USDA Agencies as well as other Departments within the United States Government and partners in academia and industry.
- Enhance **transfer of energy technology** to agriculture producers, suppliers, and users.
- Establish effective communication and outreach for agricultural energy **extension and education** programs.

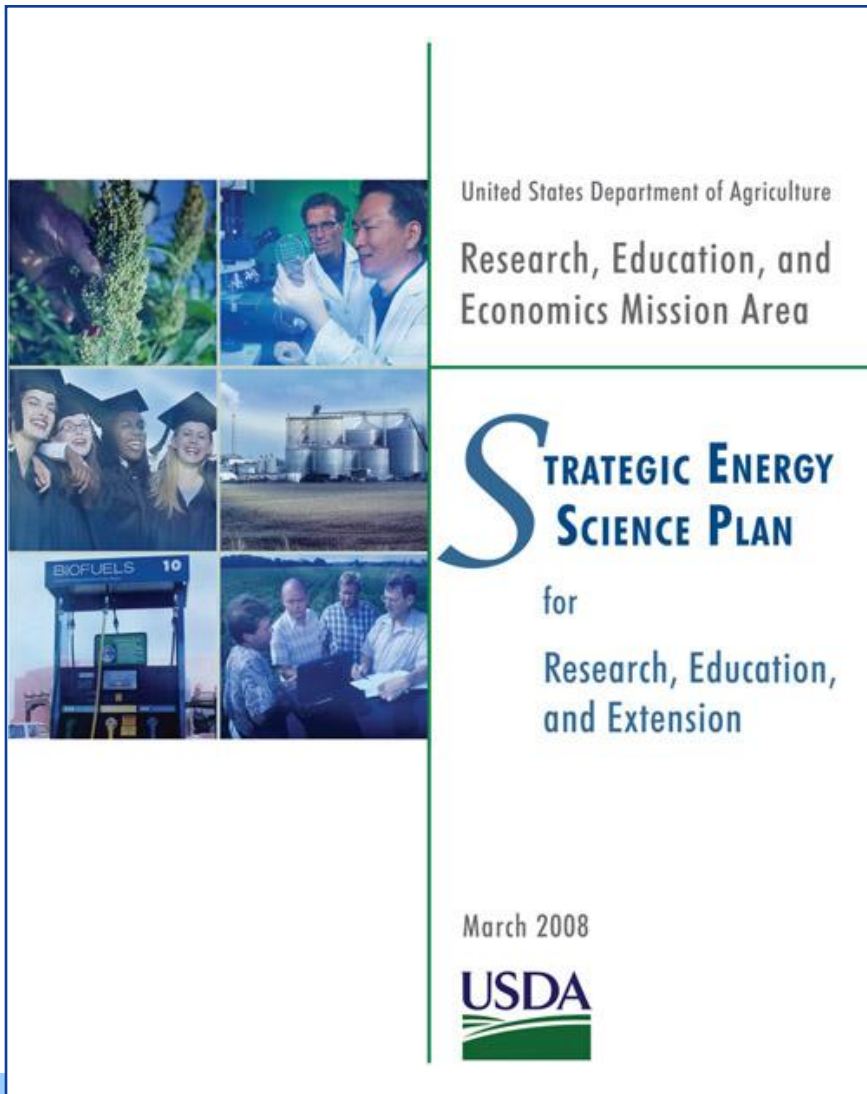
USDA/REE Energy Science and Education Workshop

THE FIRST STEP

- In September 2007, REE held an “Energy Science and Education Workshop.”
- Attendees at this workshop included leaders in bioenergy and bioproducts research from the USDA, other federal agencies and the nation’s leading Institutions of higher learning.
- The product of this workshop is a roadmap for REE’s future bioenergy research, education and extension programs.



USDA Energy Research, Education, and Extension Strategy



***This Plan presents a
unifying vision and goals for
research, education and extension
energy initiatives***

www.reeusda.gov

Purpose of the Plan

- Establish **focus** and facilitate **collaboration**
- **Create public benefit** through both internal activities and partnerships
- Pursue reliable and **sustainable** sources of agriculture and natural resource-based energy and biobased products
- Promote the health of **rural communities**
- Provide **responsible stewardship** of our natural resources

Unique Resources and Capacities

- **Regional and local** outreach
- **Genetic resources**, collections and crop breeding/genetics/genomic expertise for feedstock development
- **Systems approach** to feedstock development, production, and conversion
- **Feedstock logistics** (harvest, transportation, storage, and pre-treatment)
- The use of animal manures, crop & forest residues, and other **residuals as feedstocks**
- Development of **biobased products** and value-added co-products
- A **network of dedicated laboratories** for performing basic and applied research
- **Integration of basic and applied research, education, and Cooperative Extension** in land-grant universities
- **Integration and coordination** of activities among the REE agencies (ARS, CSREES, ERS, NASS)

Strategic Vision

“Growing a clean, efficient, sustainable energy future for America”

We have a vision that in five years the U.S. will have:

- Agriculture- and natural resource-based energy that enhances stewardship of our environment
- Sustainable, secure, renewable energy sources
- Vibrant and energy-efficient rural communities

“USDA – a recognized leader in innovative energy solutions”

We have a vision that in five years the USDA will have:

- A **workforce** with expertise and foresight to address renewable energy challenges
- **Robust partnerships** with Federal agencies, universities and the private sector
- A **fully integrated, systems approach to national and regional energy needs**

5-year Leadership Objectives

- USDA Energy Research, Education, and Extension Plan is **recognized for its innovation** across REE, USDA, Federal agencies, Congress and university community.
- The Energy Research, Education, and Extension Plan is **incorporated into U.S. national energy strategy** and action plans.
- Successful implementation of all initiatives, with outcomes **continuously re-evaluated** and executed for maximum achievement.
- A strong **network of partners** with a shared vision is in place.
- Vibrant and effective **public and private partnerships** focused on specific issues with defined scopes exist at the **national, regional, State, and local** levels.
- Organized **educational partnerships**, including youth and adult education as well as college curricula are in place.
- Well-established **marketing partnerships** with scientific, educational, and industrial organizations are functioning.

Key Leadership Strategies:

- **Align internal agencies and partners (LGUs) and external partners** (e.g. Forest Service [FS], Natural Resource Conservation Service [NRCS], DOE, EPA, industry), and then identify and recruit external partners based on shared vision and needs with regard to specific topics and functions.
- **Use existing energy committees and initiatives** to promote the Energy Research, Education, and Extension Plan and programs (e.g., ABBREE, BBCC, Energy Council, Biomass R&D Board, NAREEEAB, BMTAC).
- **Initiate joint planning** that will result in progress through collaborative work.
- **Facilitate the process of developing voluntary, stakeholder-driven, and credible certification systems** to ensure sustainability of bioenergy and biobased products.
- **Convene an annual USDA/REE Energy Summit** to both maintain buy-in of the Plan and track implementation of programs as well as to identify new and emerging opportunities.
- **Demonstrate incentives for partnerships** with prospective and current partners by surveying what has worked historically.
- Take full advantage of **USDA's communication infrastructure**

Programmatic Goals

- Sustainable agriculture and natural resource-based energy production
- Sustainable bioeconomies for rural communities
- Efficient use of energy and energy conservation
- Workforce development for the bioeconomy

Goal 1: Sustainable Agriculture and Natural Resource-Based Energy Production

Results by 2013:

- Whole life-cycle analyses of at least two potential regionally appropriate production systems. (8.9)
- High quality, cost effective feedstocks are developed. (8.1, 8.2, 8.8, 8.11)
- High quality, cost effective feedstocks are sustainably produced following REE science-based conservation plans. (8.2, 8.12, 8.13)
- Demonstrate at least two scalable conversion technologies suitable for regional energy production. (8.8)
- Sustainable integrated harvesting, transportation, storage, conversion, and distribution systems exist. (8.8, 8.11, 8.13)
- Analysis of environmental and economic impact of bioenergy production will have been conducted at the regional and national levels. (8.4)
- Analytical tools have been developed to assess the site-specific impacts of bioenergy feedstock production. (8.4, 8.11, 8.13)
- Comprehensive databases of feedstock characteristics are publicly accessible. (8.8)

Goal 1: Sustainable Agriculture and Natural Resource-based Energy Production

Key Strategies:

- **Evaluate** existing and develop new economic and biophysical **models** to assess the sustainability of regional production of energy and products.
- Assemble a critical mass of genetic resources, biological information, and expertise to **develop** one or more **sustainable energy biomass crops** or crop mixtures for each region.
- Identify, charge, and seek funding for **multidisciplinary teams** that will develop genetic, production, harvesting, storage, and conversion technologies and methods to support energy and coproducts availability; and for the development of subsequent educational strategies to facilitate adoption.
- Utilize tools and **partnerships** to facilitate research and education issues (i.e., DOE, Sun Grant Initiative (SGI)) and to inform decisions at the **local, regional, and national** levels.

Goal 2: Sustainable Bioeconomies

Results by 2013:

- **Decision tools are available** and training in their use is provided to all farmers, rural communities, processors, and policy makers.. (8.6, 8.9)
- **Cooperative Extension educators** are fully trained to support farmers, processors, and rural communities
- **eXtension Communities of Practice** are formed to support farmers, processors, and rural communities
- Biobased products and bioenergy coproducts have been **evaluated for sustainability and market potential** for regional integrated bioeconomies. (8.1, 8.6, 8.8, 8.9, 8.11, 8.12)
- Those **farmers, communities, and processors** displaced by a growing bioenergy industry in transitioning to new viable economic activities are **assisted**. (8.6, 8.12)

Goal 2: Sustainable Bioeconomies

Key Strategies:

- Use environmental, economic, and social analyses as tools to inform activities and research. (8.4, 8.6, 8.9)
- Train new and existing **Cooperative Extension** personnel to support activities within the rural bioenergy/bioeconomy and transitioning agricultural sector.
- Organize **eXtension** (on-line) Communities of Practice and develop web-based interactive user information.
- Evaluate **market potential** of biobased products and co-products as part of the rural bioeconomy portfolio. (8.8, 8.9)
- Evaluate and **understand the changing market conditions** for traditional agricultural commodities. (8.6, 8.9)
- Develop new and enhance existing tools and partnerships to **inform decisions at local, regional, and national levels.**

Goal 3: Energy Efficiency and Conservation

Results by 2013:

- **Energy education programs**, including eXtension Communities of Practice established by Cooperative Extension personnel to reach traditional and non-traditional audiences.
- **Energy intensity** of agricultural production **reduced** by 10 percent.
- Establish a national agriculture- and natural-resource-based **energy awareness campaign**.
- **Promote energy conservation awareness** across the United States.

Goal 3: Energy Efficiency and Conservation

Key Strategies:

- Lead the establishment of a **national energy extension network** in partnership with land-grant universities and Federal agencies.
- Establish **Energy Communities of Practice in eXtension**.
- Develop and publicize **decision support tools** for home energy and on-farm energy conservation.
- Establish an **energy garden** at the National Arboretum in collaboration with a national conservation group.
- Develop a university-based program for **energy conservation education**.

Goal 4: Workforce Development

Results by 2013:

- Triple the number of students in college- and university- based bioenergy & bioeconomy education programs.
- A large proportion of high school students are aware of and take action on bioenergy concepts and agriculture and natural resource roles in developing the country's energy future.
- Expertise is available to implement Cooperative Extension energy programs across all States.

Goal 4: Workforce Development

Key Strategies:

- Establish and publicize a roadmap of educational activities that will lead to **careers in bioenergy and the bioeconomy**.
- Conduct a **workforce needs assessment** for the local and regional bioeconomy sector, including projections of all roles.
- Coordinate educational programs where appropriate to develop **national-scale centers of research and education** (K-12 & adult and informal programs) delivered through robust distributed educational programs in every region.
- Add significant numbers of **graduate- and postgraduate-level grants** to existing programs with a focus on bioenergy.
- Increase to at least 50 percent number of LGUs offering **bioeconomy courses**.

Goal 4: Workforce Development

Key Strategies (Continued):

- Increase Higher Education **Challenge Grant** and emphasis on distance education.
- Increase the number of REE **bioenergy curriculum development** grants.
- Establish and increase the number of REE **bioenergy internship programs**.
- Sponsor training about bioenergy and bioeconomies **for existing USDA and Cooperative Extension staff**.
- Establish a **scientist exchange** program, among e.g., ARS, DOE, university partners.

Critical to Implementation

- **Creating Partnerships for Plan Implementation**
 - **USDA & Federal Agencies**
 - **University and State Partners**
 - **Associations and Organizations**
 - **Industry**

Energy Plan Implementation

- **24 Month Goal Action Plan (ABBREE)**
 - Initial Goal Action Plan (Complete)
 - Identify Goal Leaders/Teams (Complete)
 - Evaluate Goal Implementation Team Plans (Ongoing)
 - Implementation (Ongoing)
- **Agency Program Alignment (ARS, CSREES, ERS, NASS)**
- **USDA Energy Summit: Building and Growing Partnerships September 29-30, 2008 (ABBREE)**

Renewable Energy-Relevant Topic Areas

- 8.1 Forests & Related Resources
- 8.2 Plant Production & Protection, Biology
- 8.13 Plant Production & Protection, Engineering
- Animal Production and Protection
- 8.4 Soil & Water Resources
- Food Science & Nutrition
- 8.6 Rural & Community Development
- Aquaculture
- 8.8 Biofuels and Biobased Products
- 8.9 Marketing & Trade
- 8.11 Animal Manure Management
- 8.12 Small & Mid-Size Farms

Small Business Innovation Research

Biofuels and Biobased Products (8.8) 2008 Emphasis

- **Production of next generation biofuels and related co-products (no support for corn grain ethanol)**
- **New crops for the production of non-food biobased products**
- **New non-food biobased products from new industrial crops**

www.csrees.usda.gov/fo/sbir

Small Business Innovation Research (SBIR) Program

In the past six years:

- **\$2 million in support for small businesses and their university and ARS partners to conduct industrial crop development and product research**
- **Tobacco, kenaf, sorghum, camelina, algae, sweet potato, guayule, switchgrass, and jatropha**

Technology Areas Supported by the USDA/SBIR Program

- Information Technology
- Robotics
- Electronics
- Biotechnology
- Nanotechnology
- Microelectro Mechanical Systems (MEMS)
- Acoustics
- Remote Sensing
- Genetic Engineering
- Material/Coatings
- Food Safety
- Biofuels
- Machine Vision
- Precision Agriculture
- Engineering
- Physics
- Chemistry

Emerging Opportunities in Feedstock Logistics

Regional requirements for different feedstocks:

Harvesting; handling; storage and quality preservation; pretreatment

Unique feedstock characteristics





Arbuckle's Native Seedster

Rural and Community Development

Focus on Innovative application of technology to address problems and opportunities that exist in rural areas

◦Rural energy needs

- Energy conservation
- Energy transmission/storage
- Local energy generation

◦Success Story

- Emerald Ranches, Sunnyside, WA
- Phase I demonstrated feasibility of using municipal biosolids to grow canola to make biodiesel. Phase II will develop a closed loop biodiesel production facility.

◦Potential Impact:

- Provides a reliable source of biofuels for municipalities and small farmers at reduced costs.



Closing Remarks

- Focus on sustainable energy (bioenergy, wind, solar) highlights the value of agricultural research, education, outreach, tech-transfer
- Strategic roadmaps such as the Energy Science Strategic Plan may create opportunities for new bioenergy and biobased product development
- The Challenge for Small Businesses: Identify and pursue relevant regional solutions for sustainable renewable energy and biobased products, wind, and solar energy

USDA SBIR Program

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- Forests and Related Resources;
- Soil and Water Resources; Aquaculture;
- Small and Mid-size Farms

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